



Carrier Ethernet for Business Services

Best Practices for Building a Winning Service Offering

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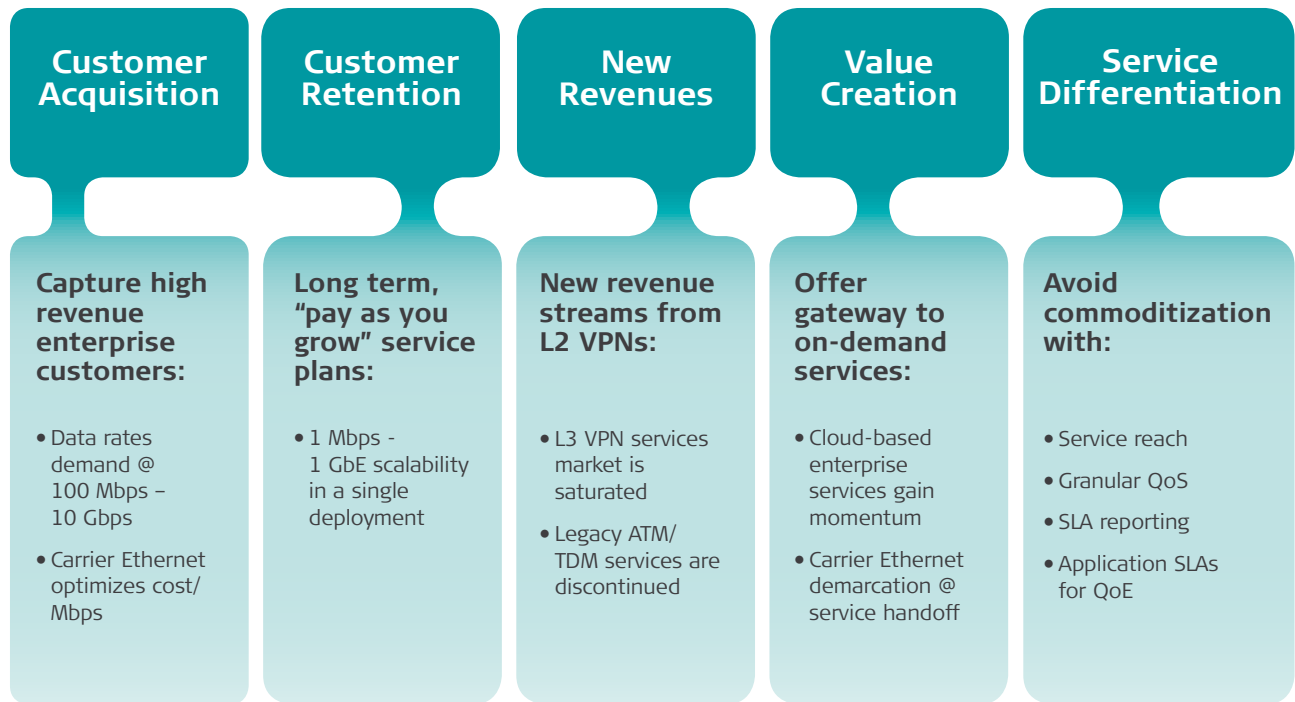
Market Snapshot

Carrier Ethernet business services are a lucrative, seemingly “recession-proof” segment enjoying a phenomenal growth and strong demand. This demand is fueled by a sharp increase in IP traffic and the rise of cloud-based services, as well as by enterprises’ dynamic business environment and closely scrutinized IT budgets. Along with lower cost per Mbps and speeds of up to 10 Gbps, Carrier Ethernet adoption by large enterprises is mainly driven by applications such as business data (ERP) and data replication, video conferencing/Telepresence, online trading, content distribution networks (CDN), and point of sale (PoS) platforms.

From their end, carriers and service providers see an opportunity to enhance their portfolio with next-generation services that are cheaper to operate while combining added user value with sustainable revenue potential.

Carrier Ethernet offers service providers innovative tools to drive growth, minimize churn and mitigate price erosions:





Carrier Ethernet's Value Proposition for Service Providers

Research analysts provide the numbers to support such claims; Vertical Systems Group, for example, believes that the total worldwide market for business Ethernet services between 2009 and 2014 will exceed \$162 billion, declaring such services "the fastest growing strategic data product for service providers throughout the world." *

Carrier Ethernet business services are now available from incumbents, metro carriers, alternative providers, and cable MSOs in North and Latin America, Asia Pacific, Europe, Africa, and the Middle East. Early high adoption rates in developed economies have led to growing competition and are consequently driving service rollouts in developing markets – both as a means to seize new territories and to serve enterprise requirements for extended coverage. In that regard, recent developments such as the Metro Ethernet Forum's E-NNI (Ethernet Network to Network Interconnect) standard, the introduction of Ethernet Exchange services and the dramatic increase in carrier-to-carrier interconnect agreements are critical in promoting further service take-up, as they define carriers' ability to serve their enterprise customers wherever their business takes them – both on and off net, on a regional, national and global scale.

Depending on the strategy adopted by providers, Carrier Ethernet offerings show great variety in terms of service mix, geographic coverage, bandwidth capacity, and service sophistication. In part, this also depends on the service provider's fiber, copper DSL or TDM assets, with distinct differences between migration scenarios and greenfield deployments. For example, Ethernet over DSL/TDM offerings are typically used by carriers with legacy installed base to extend service reach and to add customers on net where fiber is not available, whereas end-to-end fiber connections characterize offerings from newer entrants to the telecom and datacom services market.

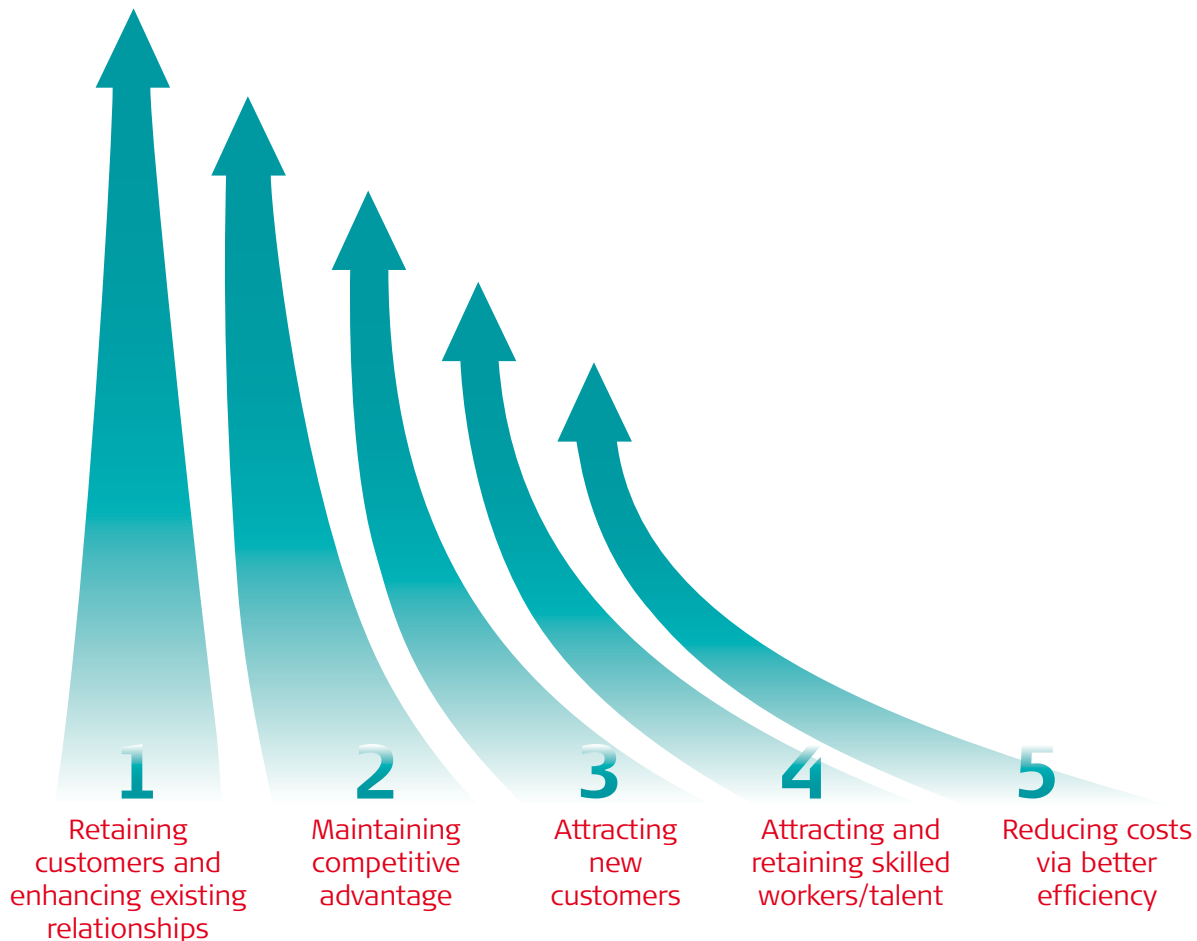
* Vertical Systems Group: *Worldwide Business Ethernet Market Update, 2010*

Beyond Connectivity: Getting in Tune with Enterprise Objectives

Communications and knowledge management tools have become instrumental in achieving enterprises' business and strategic goals. ICT has transitioned from an operational expenditure, merely providing connectivity options, to become a key element dictating the enterprise's ability to economically increase productivity, foster innovation and accelerate time to market. In other words, mobility and collaboration enablement, streamlined processes and improved customer experience are critical for making informed decisions and implementing change quickly to increase competitiveness.

For the service provider, this translates to service-based networking and communications solutions that need to be better aligned with enterprises' objectives. For example, service elements that focus on distributed communications and support for Web-based applications – together with differentiated quality of service – stand a better chance to gain traction among organizations that need to connect disparate locations, workforce on the move, and other stakeholders in the organization. Beyond many-to-many connectivity and service reach, additional critical capabilities include bandwidth scalability, non-disruptive upgrades and zero downtime.

Top Five Priorities of CEOs and Senior Business Executives:

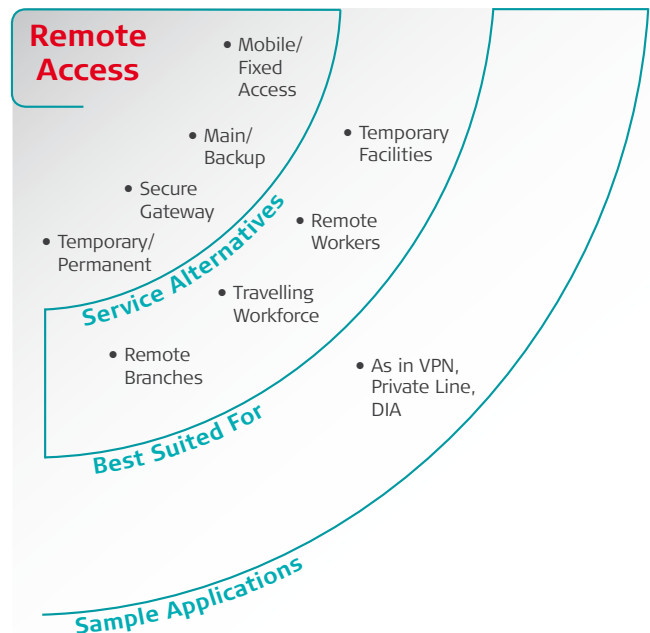
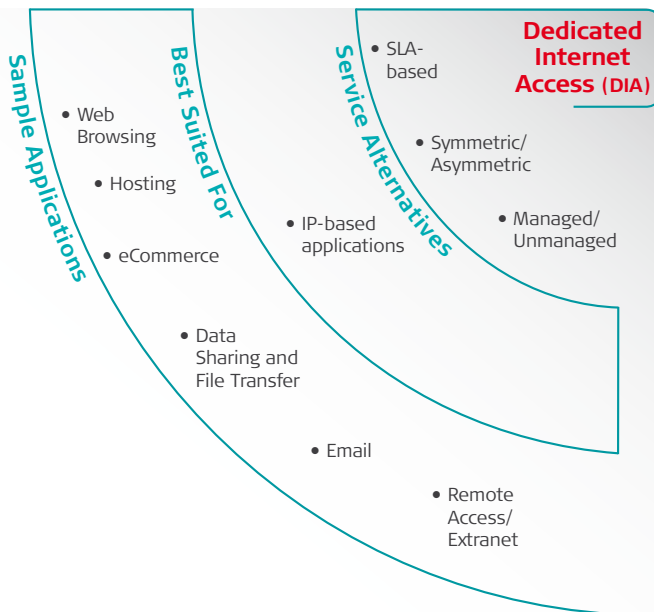
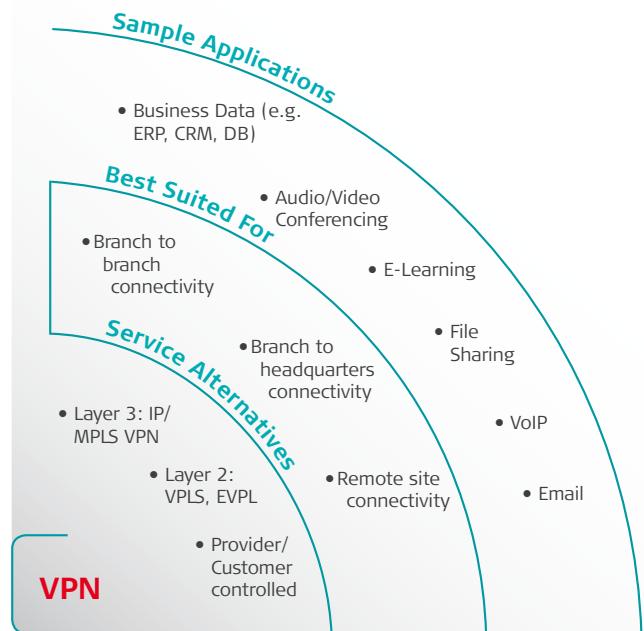
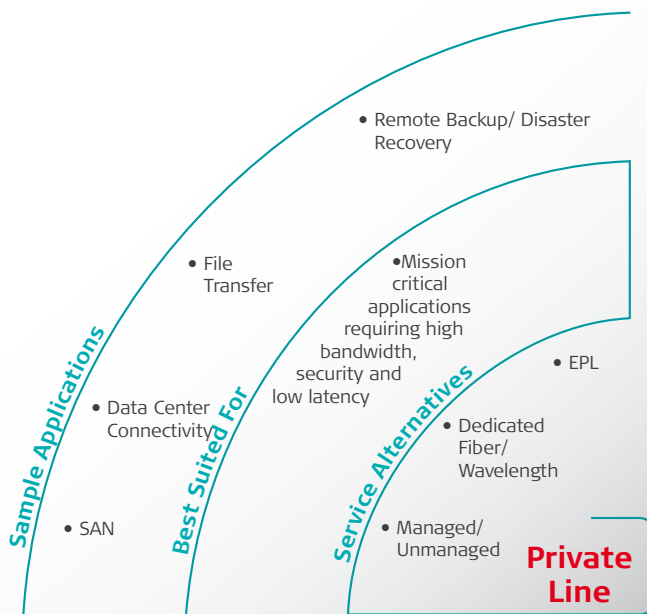


Source: 2010 Gartner CEO and Business Executive Survey

Typical Network Services Offerings

Depending on service providers' business focus and technological expertise, a typical service offering for medium and large enterprises will include some or all of the following inter-branch connectivity options:

Carriers and service providers are offering a varying mix of DIY, co-managed and fully outsourced connectivity services, to meet a broad range of enterprise requirements. These are affected by issues such as company size, number and spread of locations, security concerns and ICT expertise, among others.

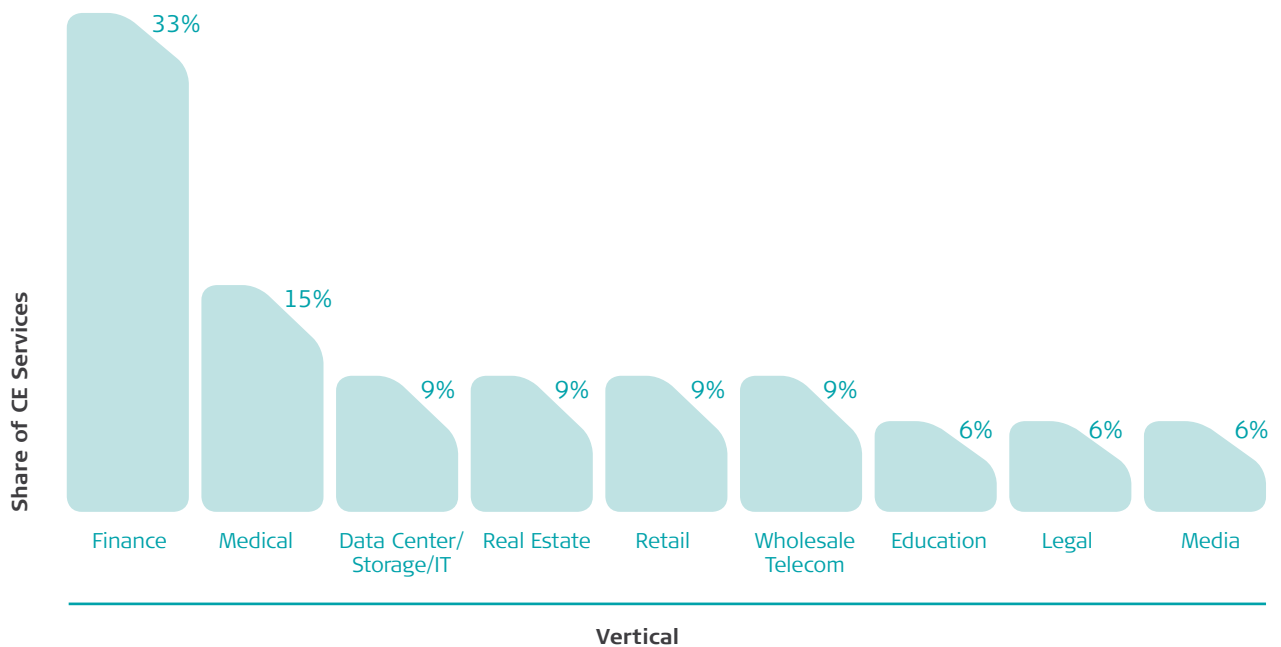


In addition, many providers are attempting to up-sell value-added services, such as WAN optimization, data center management and cloud-based virtualization, in an effort to grow their revenue base.

Industry Verticals



The popularity of Layer 2 Carrier Ethernet services tends to vary across different market sectors:



Source: Metro Ethernet Forum

Enterprises from various sectors are looking at Ethernet services to address specific industry concerns:

Finance:

Enterprises in the financial services industry share several key challenges. High volumes of electronic transactions, data vulnerability, intense competition, and regulatory requirements spell out the need for secure, ultra-fast and extremely reliable communications for commercial banks, investment firms, trading houses, and insurance companies alike. Communications services for the financial market must therefore:

- Ensure High Availability and near-zero latency so that information between branches, exchanges and data centers can be delivered with millisecond accuracy. This includes minimal

end-to-end delay for algorithmic trading and similar applications

- Offer global reach to ensure high performance connections, backed by stringent SLAs, between key financial hubs, as well as between distributed branches, mobile workers and remote locations.
- Provide high bandwidth capacity for the multitude of applications, transactions and massive market feed data streams to deliver timely responsiveness and failsafe operations
- Protect critical data from security attacks and unauthorized access



Healthcare:

Healthcare IT is undergoing a major transformation in recent years:

- Medical imaging and electronic health record (EHR) systems boost bandwidth as well as data storage capacity requirements
- Regulatory issues – such as the HITECH Act (Health Information Technology for Economic and Clinical Health Act) in the US and the European Commission’s eHealth action plan – force organizations to address the ramifications of digitizing paper-based systems, while ensuring secure management of patient information to comply with privacy requirements
- A variety of authorized users – a substantial proportion of which are located off-site – need timely access to clinical data at various times

In particular, new Telemedicine and Telesurgery applications bring forth the need to provide reliable broadband connectivity, real-time feeds and

quality transmissions to healthcare professionals in remote, sometimes rural, locations and off-campus clinics.

Medical centers may encompass numerous branches and clinics, extending beyond metro areas and in many cases served by non-fiber infrastructure, such as copper, microwave and satellite. Typical networks may consist of large volumes of imaging and diagnostic equipment, servers, phones, and work stations – both fixed and mobile. Health information system managers are therefore in need for multisite connectivity services that will enable reliable performance for bandwidth intensive applications, such as storage, backup and distribution of HD imagery for electronic picture archiving and communication systems (PACS). This translates to real-time, high quality and error-free delivery of data to and from multiple locations, protected by redundancy, business continuity and disaster recovery schemes.



Retail

Enterprises operating retail outlets and chain stores are in need of effective communications for voice and data between multiple point of sale (POS) locations and regional warehouses, data centers and corporate head offices – in many cases spreading across different regions. Main priorities in this market vertical include:

- Generating real-time, actionable information to positively affect customer behavior, supply-chain management, operations efficiency, and cost reduction
- Ensuring security – whether for transaction processing, to comply with payment card industry (PCI) regulations, for perimeter

monitoring using CCTV surveillance cameras, or for merchandise security, using anti-theft and loss prevention tools

Traditional 56k dial-up services may have been sufficient in the past for transmitting POS data from numerous locations, however today's retail establishments are in need for cost effective communications solutions that scale better, offer better capacity and resiliency, while allowing retailers to keep up-to-date with sales data and stock levels. Packet-based tailored solutions can therefore help enterprises to avoid down times, protect customer information and seize business opportunities by matching stock fulfilling plans with anticipated demand.



Education

Primary, secondary and higher education institutions are transforming their IT networks to support an increase in voice and data traffic and the addition of new collaborative tools, both in and out of the classroom, on and off campus. Distance learning, eLearning and extended campus programs require new connectivity solutions for universities, schools and academic research institutes, as online courses and virtual libraries cannot be economically supported by mature network resources.

- Intelligent site-to-site and remote access connections are required to support and prioritize

web-based and VoIP services, together with video conferencing and media sharing applications

- Data security must be guaranteed for registration details, financial transactions and academic records

In times of shrinking budgets and cost-cutting measures, Carrier Ethernet services provide an ideal fit for the education sector, allowing non-stop connectivity with higher flexibility and greater simplicity for students, staff and faculty.



Tailoring Service Packages to Meet Key Vertical Priorities

Embracing the motto “you can't be everything to everyone”, many carriers target specific market verticals as part of their “go to market” strategies. A common example would be a carrier catering for financial enterprises by providing network services that are tailored to support high frequency and algorithmic trading platforms. In such networks, forwarding and roundtrip propagation delays are reduced to milliseconds or lower using proximity hosting services, hardware-accelerated packet processing technologies and dedicated multi-Gbps point-to-point fiber connections.

By tailoring service packages that address unique challenges shared by many enterprises in the same industry, service providers gain the required expertise to better position their offering.



Service Positioning Strategies

The following sections review various strategy alternatives that service providers can employ to address their need to create value in light of price erosion in mature, highly competitive markets.

Service differentiators

In addition to SLA guarantees, such as packet delay, delay variation (jitter), loss, and availability, service differentiators can cover a variety of aspects, with offerings ranging from basic to premium, whereby enterprises are able to select the service combination that best suits their needs.

By offering a broad range of service choices, including scalable bandwidth from low to super high rates, a variety of QoS and SLA levels, connectivity topologies, and flexible management alternatives carriers can rely on a strong portfolio that provides future upgrade opportunities and a better chance of meeting the enterprise's long-term objectives.

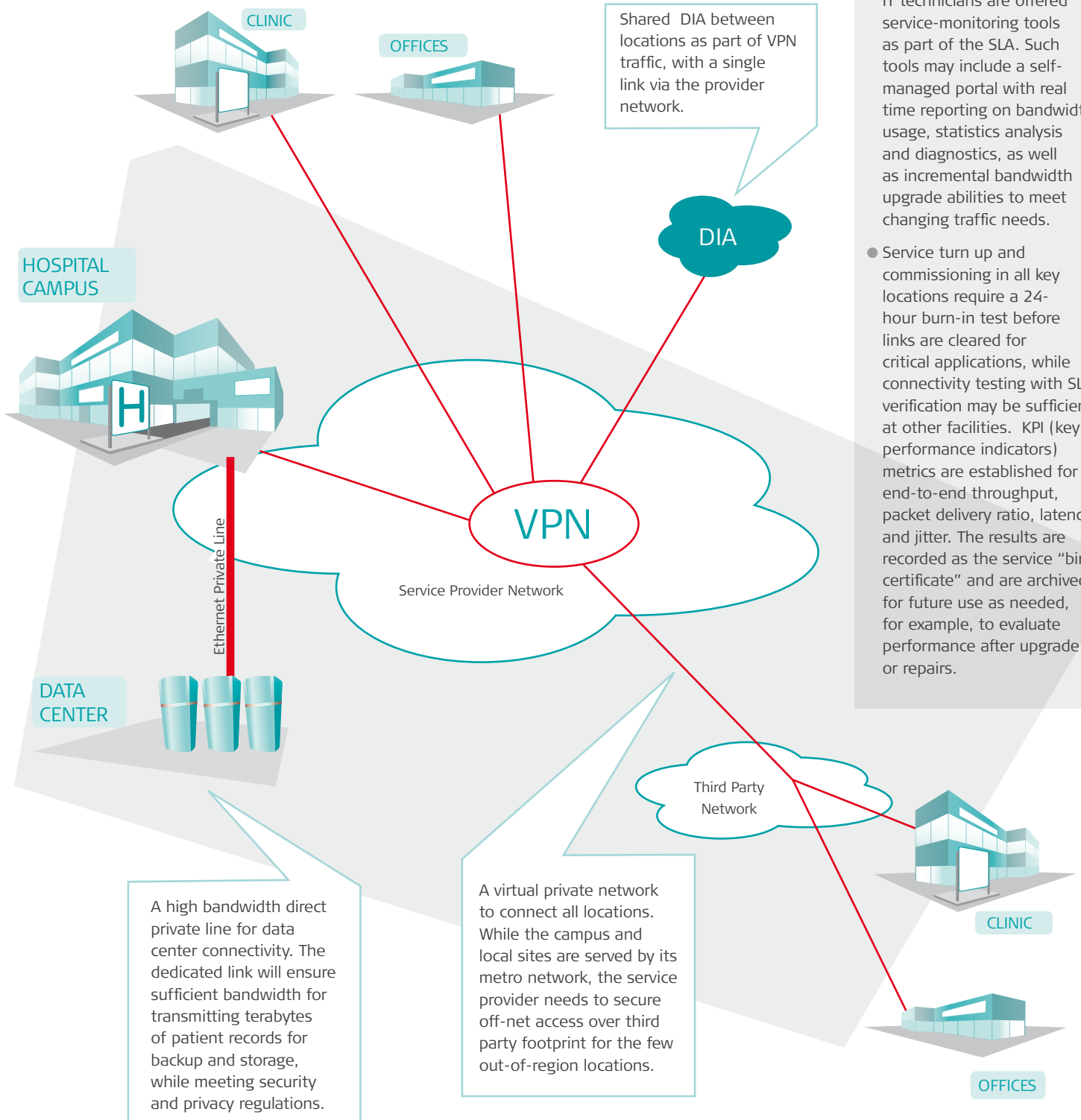


Sample Service Differentiators	Minimum Offering	Intermediate Offering	Maximum Offering
Multi-tier QoS	Single Level	3 Levels, Burstable	4 Levels or More
Security	VLAN Separation	Dedicated Network	Data Encryption
SLA Monitoring & Reporting	No Reports	On-demand Reports	Self-Managed Portal
Business Continuity	No Protection	Physical Port Protection	NSPF architecture, Port and Service Protection, HA Redundancy
Service Reach	Metro	National	Metro to Long Haul
Application Awareness	None	Application-based Statistics	Application-based SLA

An important differentiator, especially for the relatively new Carrier Ethernet services, is the provider's ability to offer standardized services, such as MEF (Metro Ethernet Forum)-certified Ethernet Private Line and Ethernet Virtual Private Line. Such certification boosts the enterprise's confidence in the carrier's ability to guarantee consistent performance and quality, however requires that network elements used for delivering the service are also certified.

For example, a health center operating a hospital campus and several remote clinics is likely to consider the following service options:

Only selected sites require premium level connections. The hospital and critical care clinics will need multiple QoS levels for voice, data, imaging and video conferencing traffic, while medical offices and outpatient clinics are not expected to require more than two or three classes of service. Likewise, critical data paths are to be protected with physical and logical link redundancy, whereas others may need little or no protection beyond daily after-hours data backup.

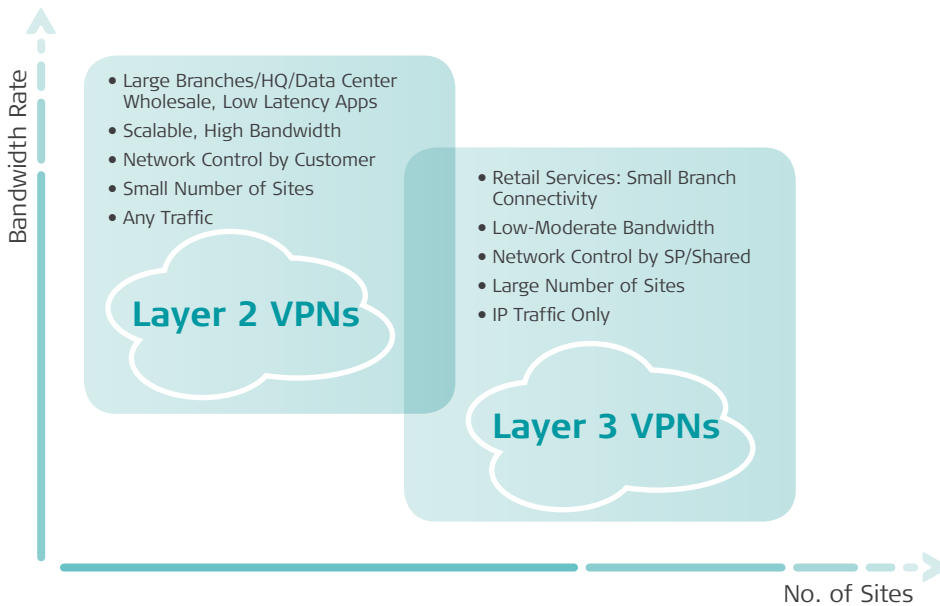


- Given the critical importance of network performance to health center operations, IT technicians are offered service-monitoring tools as part of the SLA. Such tools may include a self-managed portal with real time reporting on bandwidth usage, statistics analysis and diagnostics, as well as incremental bandwidth upgrade abilities to meet changing traffic needs.
- Service turn up and commissioning in all key locations require a 24-hour burn-in test before links are cleared for critical applications, while connectivity testing with SLA verification may be sufficient at other facilities. KPI (key performance indicators) metrics are established for end-to-end throughput, packet delivery ratio, latency, and jitter. The results are recorded as the service "birth certificate" and are archived for future use as needed, for example, to evaluate performance after upgrade or repairs.

Carrier Ethernet and IP VPN Services

Despite the growing market demand for Carrier Ethernet services, some carriers remain reluctant to launch aggressive rollout plans in fear of hurting their on-going revenues from Layer 3 IP VPN services. In their view, basic IP VPN services –with rates that are already in steady decline, especially for contract renewals – risk an additional hit from attractively priced Layer 2 VPNs.

Industry consensus, however, sees the two service types as complementary, with typical characteristics appealing to different enterprise need-sets and use profiles:



Key decision factors:

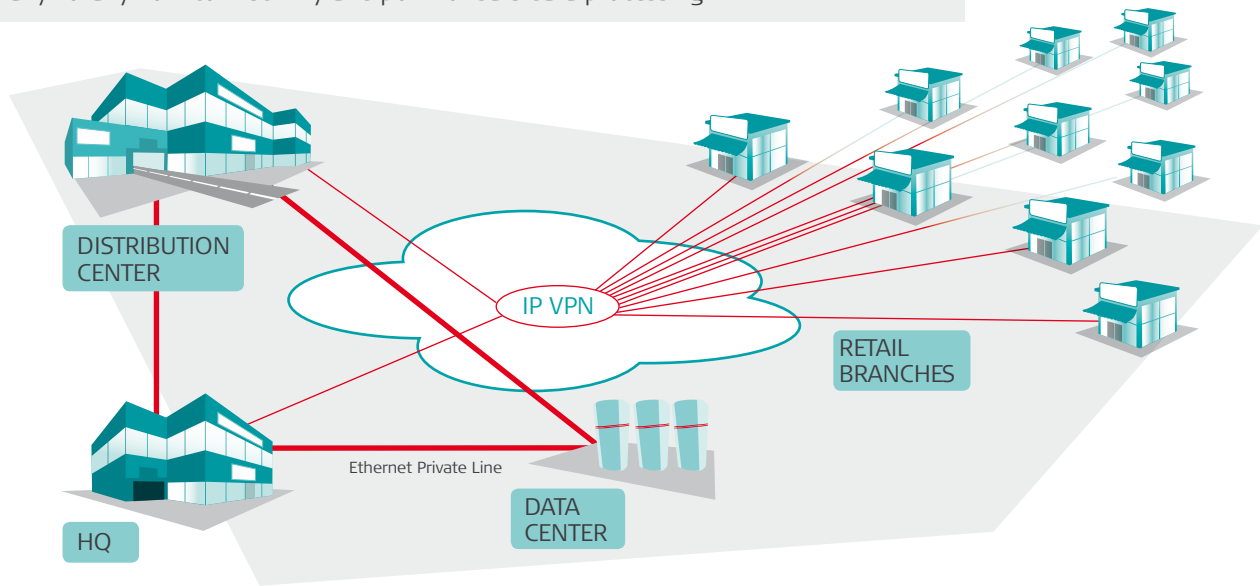
Cost • With lower price per Mbps, Ethernet VPN services are perceived as ideal for high bandwidth connectivity typically used for large branches or data centers, as well as for wholesale services

Connectivity • IP VPNs, on the other hand, provide a better fit for installations involving a very large number of sites and/or requiring low to medium bandwidth rates. IP VPNs are extremely popular in SMB segments and for remote access

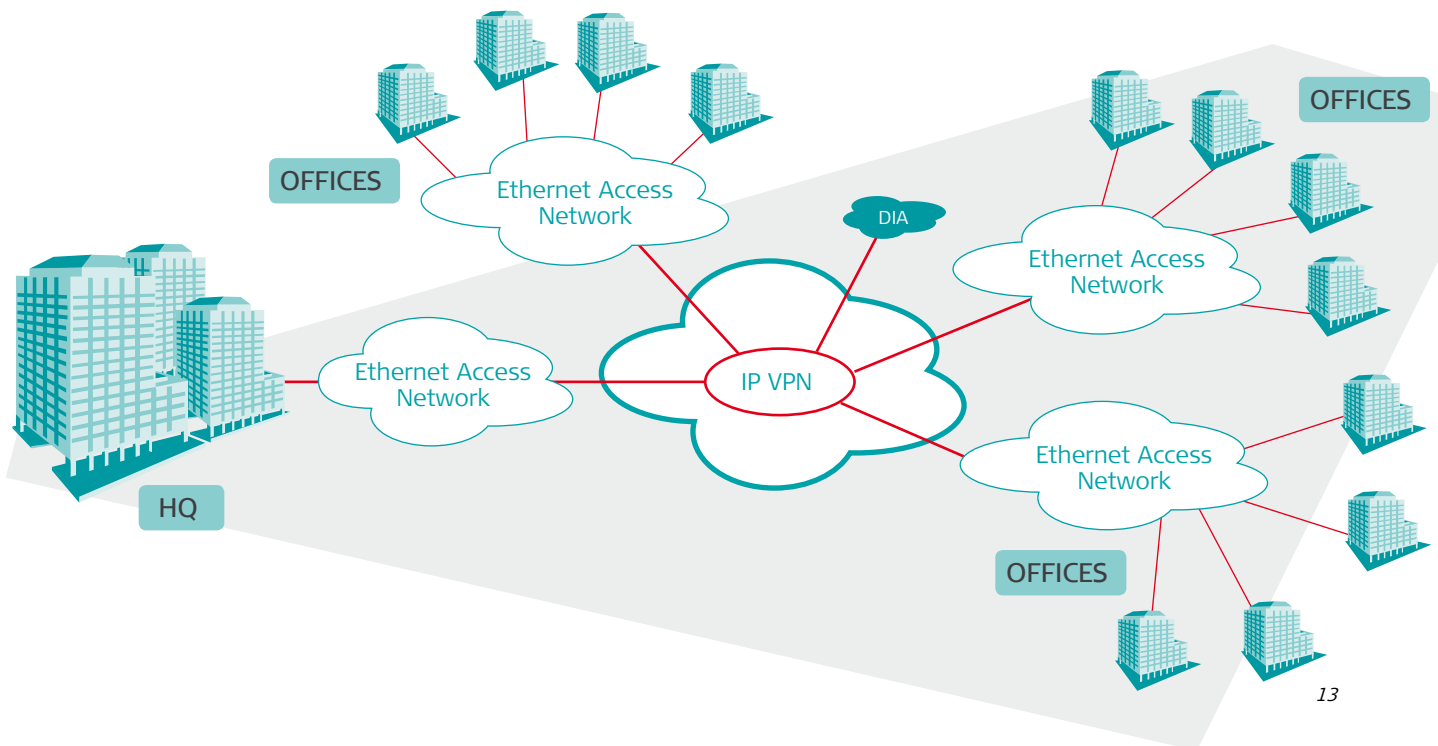
Control • Companies that are reluctant to hand over the control of their IP address space and routing tables to their service provider are more comfortable with Layer 2 VPNs, where routing is self-managed. Enterprises that do not share such concerns, as are those who lack the relevant in-house technical expertise, prefer L3 VPNs

Given the complementary nature of Ethernet and IP VPNs, there is a growing trend among service providers to offer a hybrid model in which both service types are used to connect different locations/applications of the same customer. In this manner, SLA-backed Layer 2 VPNs strengthen the SPs' overall offering with innovative services that are designed for specific scenarios not addressed by IP VPNs.

For example, the service combination best suited for a retail enterprise with hundreds of store locations, regional distribution centers, data center, and corporate headquarters will include an Ethernet VPN for connecting the data center to distribution centers and headquarters, while an IP VPN is used for branch connectivity. The former will meet the bandwidth, delay and control requirements for high volume content delivery, storage and disaster recovery; the latter is ideal for any-to-any VoIP connectivity and point of sale data processing.



Ethernet is also gaining momentum as a transport access technology for L3 services. In this scenario, multiple services and applications are converged over the same access link to simplify IT operations, while ensuring quality solutions for Internet access and VoIP services, as well as for local and long-distance data connectivity (LAN-to-LAN).



Intelligent Demarcation Equipment - RAD's EtherAccess Portfolio



A critical part of all business services are the customer premises equipment (CPE) installed by the service provider at the various enterprise locations. Separating the enterprise and carrier networks and functioning as the service hand-off points, these devices must be capable of ensuring strict compliance with SLA terms and guarantees.

RAD's EtherAccess® portfolio of managed demarcation devices enable SLA assurance of EPL, EVPL and E-LAN services, while performing transport demarcation for Layer 3 IP services. By using a single intelligent device, enterprises reduce the number of CPEs they need to purchase. Additional benefits include:

EtherAccess

www.ethernetaccess.com

1

Certified by MEF, EtherAccess products ensure consistent service delivery for **on-net** and **off-net** customers over fiber, bonded circuits, SDH/SONET, and DSL access

2

Hierarchical QoS for multi-priority traffic and **packet delivery performance** support with latency, jitter, loss and availability guarantees on a per-flow basis

3

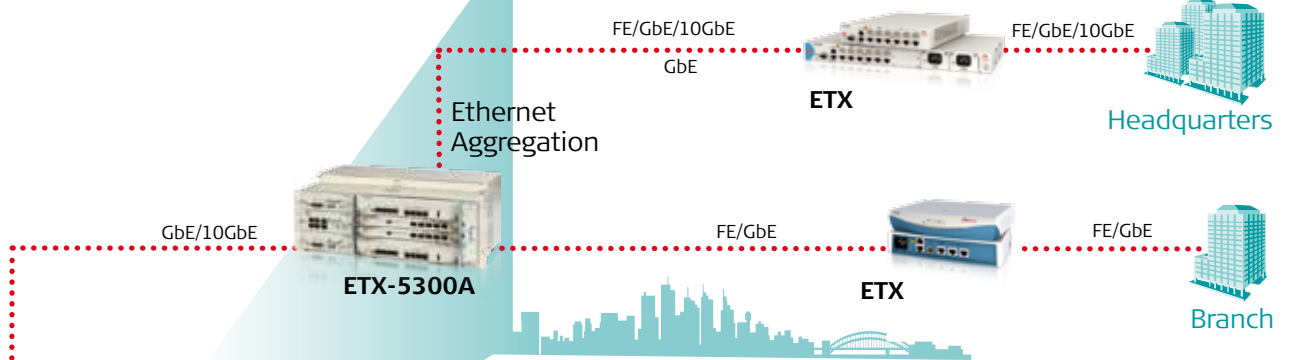
Complete **service lifecycle management** allows carriers to offer customers advanced tools, such as customer reporting and speedy fault resolution

4

High Availability and **service continuity** design for critical applications and connections with extensive redundancy and protection schemes

RAD's Ethernet Solutions

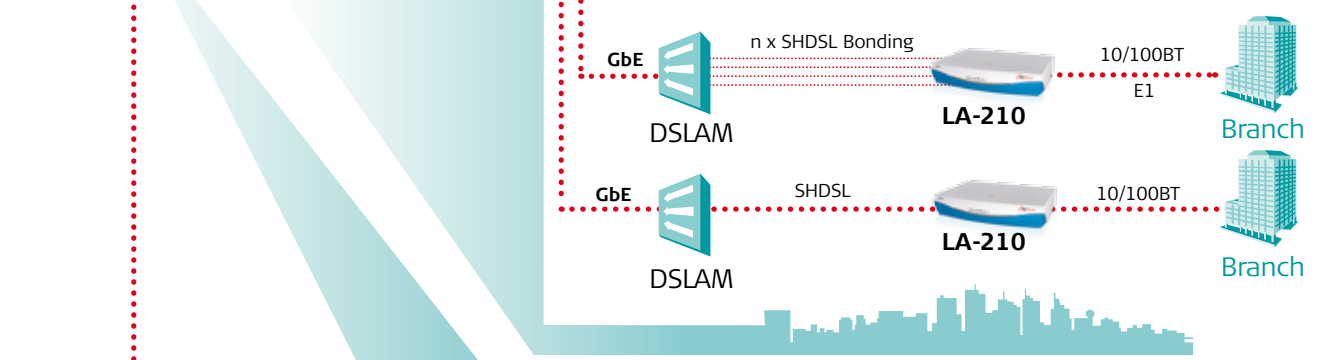
Ethernet Over Fiber



Ethernet Over PDH



Ethernet Over DSL



Ethernet Over SDH/SONET



